Journal of Economic & Financial Research
ISSN : 2352– 9822/ E-ISSN : 2588-1574
Volume: 11 Issue: 02 / December -2024
P 778 – 808
OEB Univ. Publish. Co.

Start-up firms as a solution to absorb the high unemployment rate and advance Algerian economic growth: Structural Analysis Using MICMAC Method

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Received: *29/09/2024* ***Accepted****: 06/12/2024* ***Published:*** *31/12/2024*

Abstract:

The Algerian government has seen start-ups as a solution to the increased unemployment rate and the stagnant labor market. This work is part of a prospective approach. Further, this study aims to analyze the contribution of Algerian start-ups in providing self-employment and creating jobs. Based on the structural analysis and using the MICMAC method, the results show that among the 30 variables studied, there are main variables that influence the start-up companies in Algeria to diversify the economy and introduce new industries. These variables can be regrouped into challenges, which are improving a supportive ecosystem, establishing favorable regulations, and boosting funding and mentorship programs.

Keywords: start-ups; unemployment rate; Algerian economic growth; MICMAC method.

Jel Classification Codes: E60, O4.

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1. Introduction

Algerian Economics faced many issues in the recent period due to the high dependency on the energy sector. Based on the official statistics, the country's economy still relies heavily on hydrocarbon exports and production. During the last years, from 2016 until 2021, the oil and gas sector was responsible for 19% of GDP, 93% of product exports, and 38% of budget income (World Bank, 2023). The high volatility of oil prices and its relation with geopolitical events and the emergence of the voices that encourage the shift to green energy in developed countries create the need to go to an economic more diversified.

While the high level of the unemployment rate has been a significant concern in the Algerian economy in the last decades, according to World Bank statistics for 2021, the unemployment rate is 12.7 percent of the overall workforce and 31.9 percent among youths between the ages of 15 to 24 (World Bank, 2023). The Algerian policymakers believed that the entrepreneurial sector, in general, and the start-up companies particularly, have the potential to make a positive impact by creating significant job positions.

The Algerian authorities encourage the youth to create their own firms to raise the entrepreneurial activities in the country at the same time to address the issue of the high level of the unemployment rate and boost economic growth away from the energy sector. The Algerian government provided many guarantees based on economic, financial, and technical support in order to support the youth-qualified and talented people to transform their ideas into successful ventures and to integrate the entrepreneurial spirit into Algerian society.

The new trend of start-ups in Algeria has been driven by the need to address the high level of unemployment among new graduates, youth, and highly skilled people. These young entrepreneurs are utilizing their skills and inspiration to establish innovative enterprises that deal with several of the country's most significant challenges. From using highly developed technologies like e-commerce platforms and mobile apps, the start-ups offer very innovative services and products in advanced sectors such as renewable energy and healthcare services. Furthermore, they moved

on from the traditional industries and created new opportunities for their businesses and their societies. With assistance from the Algerian state and financial support from the private sector, start-ups have the capacity to boost economic growth and job creation for the next decades.

This research aims to examine the role of different principle factors and variables in boosting the development of entrepreneurial environments in Algeria and encouraging the establishment of start-ups. Further, from reviewing the government's efforts, the opportunities, and the challenges that face these kinds of new businesses, we can ask the following question: **Do start-ups have the ability to absorb the high unemployment rate in Algeria and advance economic growth?**

To answer this question, this paper is structured as the following; the next section offers a review of the literature on start-ups and unemployment in Algeria. It represents an overview of the research on the crucial role of start-ups, an assessment of the opportunities that are provided to support Algerian ventures, an analysis of the challenges that face the success of start-ups in Algeria, and the added value of this study to the literature. Section 3 discusses the methodology of the research and the data. Section 4 dedicates to the structural analysis MICMAC approach and the results of the MICMAC approach. Section 4 represents the conclusion of the research.

2. The high level of unemployment among graduates in Algeria

The increase in the level of unemployment among young people, new graduates, and highly skilled individuals in Algeria is a pressing challenge that requires quick intervention from the authorities, and it needs effective solutions. In our research paper, we will try to highlight the significant factors that lead to the high level of unemployment among graduates.

One of the leading causes is the mismatch between the job seeker and the needs of the job market. The gap between Algerian education and employer needs is a critical issue with important causes

and consequences. The old teaching methods and techniques used in the Algerian schools and Universities are one of the primary factors of this disconnect. The program usually focuses on theoretical knowledge over practical skills, preparing graduates unprepared to satisfy the particular requirements of businesses. Insufficient industry cooperation and involvement in the development of curriculum further lead to the disparity between educational outcomes and employer expectations. This mismatch has significant and adverse effects on the new graduates in particular and the economy as a whole. It is difficult for students to find suitable job opportunities resulting in high unemployment and underemployment rates. In addition, the economic development of the country is hampered by the difficulty of companies in locating qualified and competent laborers to satisfy their requirements. In order to solve this matter, the Algerian education system must endure comprehensive reforms that match educational programs, instructional methods, and industry engagement in order to close the divide between educational institutions and business needs (Samraoui et al., 2022). Only via these modifications can Algeria guarantee that its education system adequately trains students for the demands of the labor market and plays a crucial role in the country's economic growth.

On the other hand, one of the consequences of the gap between the Algerian education system and the labor market needs is the surplus of graduate people from particular fields such as computer science, engineering, and artificial intelligence. These highly qualified individuals face the issue of finding employment opportunities that match their advanced qualifications. At the same time, the other sectors face a shortage of skilled workers. Likewise, the lack of diversification in the Algerian economy, which depends heavily on income from oil and gas, hinders the creation of employment opportunities for highly skilled professionals in other industries. This over-reliance on only one sector restricts the potential for economic development and the creation of jobs for people with specialized talents. Limited investments in research and development,

technological innovation, and entrepreneurship also restrict the establishment of a dynamic and competitive business environment capable of absorbing highly competent employees. As a result, a large number of highly qualified people feel obliged to look for job opportunities abroad, resulting in a brain outflow that harms the growth of the domestic workforce (Bouazza et al., 2015). Algerian authorities have to focus on educational reforms that correspond with demands in the labor market, diversify the economy, and encourage creativity and entrepreneurial spirit in order to reduce the high unemployment rate among highly qualified individuals.

3. What does a start-up company mean?

Frequently the term "start-up company" is utilized as a description of a recently established business in its earliest phases of growth. These businesses are distinguished by their innovative concepts, high growth potential, and desire to affect change in traditional industries. To comprehend what a start-up company is, it is necessary to examine its definition and characteristics, as well as the various phases of its development and growth, besides the definition of the Algerian legislator to this type of company. By analyzing these different concepts, we can obtain a thorough comprehension of the nature and significance of start-up companies in the current dynamic business environment.

A start-up company is a newly founded business that seeks to introduce innovative products or services to the marketplace. Start-ups are distinguished by their high growth potential, competitive nature, and scalability-centric goal. These businesses tend to be found in industries experiencing rapid technological advancements and are motivated by a desire to make a substantial impact. Start-ups are frequently associated with a high degree of uncertainty because they operate in an environment of high levels of change and encounter numerous obstacles, including limited financial funding, a lack of reputation, and massive competition. Furthermore, start-ups are renowned for their capacity to pivot and modify their business models

in response to market input and emergent trends. This enables them to be flexible with a variety of strategies and methods, making them highly adaptable and open to market needs (Sutton, 2000)Overall, start-up companies are dynamic entities with distinctive qualities, making them essential partners for innovation and economic development.

From initial concept to full-scale implementation, the path to success for a start-up may be extended and winding. Ideation, or the process by which the seed of an idea for a firm is planted, is the first step of a start-up's life cycle, as described by Duruflé, Hellmann, and Wilson. In this phase, the start-up does its preliminary planning, including brainstorming, market research, and the identification of an issue to answer. Once the concept has been refined, the following step is validation, which targets to assess the business model's validity. This phase entails undertaking market research, collecting opinions from prospective consumers, and strengthening the value proposition. The next phase is execution, which entails constructing the Minimum Viable Product (MVP) and acquiring the initial consumers. This phase calls for solid execution skills, efficient resource allocation, and quick decision-making. After the business model has been effectively implemented, the start-up starts the scaling phase, during which quick expansion and an increase in client base are primary objectives. Planning, strategic alliances, and efficient scalability are all essential at this stage (Duruflé et al., 2017).

In Executive Decree n°20-254 of Muharram 27, 1442, which corresponds to September 15, 2020, the Algerian legislature provided a precise definition of a start-up business. Additionally, the decree established a national committee charged with giving the "start-up" status. For a company to be designated a start-up in Algeria, it must meet the criteria specified in the decree. Initially, the business should not have existed for more than eight years. This requirement guarantees that the term "start-up" is reserved for relatively new businesses that are still in the early phases of development.

Furthermore, the company's business model must be founded on novel concepts, products, services, or business models. This criterion highlights the significance of creativity and originality in a start-up's operations. The capital of the business must also be owned by physical persons, approved investment funds, or other businesses that have also been awarded the start-up label. This provision ensures that the start-up ecosystem in Algeria remains vibrant and collaborative. The potential development of the company is an essential consideration for the Algerian legislator. This criterion emphasizes the significance of scalability and quick expansion in the start-up sector. Finally, the company cannot have more than 250 employees. This limit ensures that start-ups remain comparatively tiny and promotes an environment of agility and adaptability. The definition of a start-up and the criteria outlined in Executive Decree n°20-254 are intended to foster innovation, entrepreneurship, and economic development in Algeria.

In conclusion, start-ups must be flexible, adaptable, and willing to learn from each experience, both success and failure along their path. By comprehending and effectively navigating these stages, entrepreneurs may improve their possibilities of establishing sustainable, growing businesses that have a substantial impact on the sectors they operate in.

4. Do Startups create job opportunities and boost economic growth?

Start-ups play a vital role in creating job opportunities and reducing the unemployment rate, particularly among highly skilled individuals, by offering the chance for motivated entrepreneurs to create their own businesses, which bring new ideas, advance innovation, increase the competition in the market, and contributing significantly in the economic growth of the county. Besides, the innovation led by start-ups opens the door to developing new sectors that compete with the traditional industries and create demand for new skills and highly qualified people.

Across the OECD countries, young enterprises play a key role in job creation and employment. On average, these enterprises employ

around 20% of the workforce, demonstrating their significance in promoting economic growth and development. Interestingly, even though their tiny size, young businesses provide almost half of all new employment. This shows their capacity to contribute to creating jobs and minimizing unemployment issues. Additionally, transformational entrepreneurs who launch new businesses have even more remarkable statistics. These entrepreneurs, who account for around 4% of all micro start-ups, are responsible for creating from 22% to 53% of new jobs in different European countries. This demonstrates how transformational entrepreneurs may have a substantial influence on employment creation and the whole economy. Such results emphasize the necessity of encouraging entrepreneurship and supporting young businesses, as they have the potential to be major drivers of employment and economic growth (OCED, 2020).

The importance of start-ups in establishing employment opportunities being an interesting topic for many studies. The research highlights that start-ups constitute an influential player in new employment prospects in the economy. This is especially essential during recessions since new businesses may assist in reducing the negative consequences of unemployment by offering alternative sources of employment. Likewise, start-ups are more inventive and active than existing companies, which may lead to the creation of diverse job positions for highly skilled workers with competitive salaries and advantages. Nevertheless, it is crucial to take into consideration that not all start-ups succeed, and the failure rate may be relatively high. However, the positive consequences of successful start-ups on employment rates cannot be ignored (Koski & Pajarinen, 2013).

Start-ups are clearly a catalyst for economic progress both internationally and domestically. These inventive businesses have the capacity to contribute to job creation, encourage advancements in technology, and push productivity. The value that start-ups produce is absolutely extraordinary since it is approximately on par with the Gross Domestic Product (GDP) of G7 countries. This demonstrates the considerable influence they have on the broader economic landscape. Actually, the amount of financial funding that start-ups got in 2021 topped a stunning $600 billion, surpassing prior fundraising

records. This massive flood of capital demonstrates the rising trust in the start-up environment and the possibility for high returns on investment. Beyond the robust fundraising statistics, the number of unicorns, referring to firms valued at over $1 billion, has risen by over 1,000. This enormous increase in the number of unicorns highlights the great potential and scalability of start-ups. These innovative companies are disrupting traditional sectors, introducing new business models, and transforming the way we live and work. With their capacity to adapt rapidly, take risks, and utilize technology, start-ups are at the forefront of pushing economic development and influencing the future (Jeremy Jurgens, 2022).

Other scientific research concentrated on start-ups as an essential part of promoting economic growth by attracting Foreign Direct Investment via various kinds of strategies. Start-ups adopt a variety of techniques to draw FDI, such as leveraging government assistance, policies, and legislation, developing strategic alliances, and concentrating on innovation and technology. Government support and policies, specifically, play a crucial influence in stimulating FDI inflows into start-ups. Start-ups often profit from tax advantages, grants, and subsidies granted by governments to promote investment and accelerate entrepreneurship. Besides, start-ups strongly seek strategic alliances and partnerships with existing firms to benefit from access to their networks, knowledge, expertise, and skills. Collaborations with larger businesses encourage start-ups to gain access to new markets, get investment, and utilize the reputation and credibility of their partners. Additionally, start-ups focus mainly on innovation and technology to attract FDI. By producing cutting-edge goods and services, start-ups present themselves as attractive investment options for both local and international investors. Likewise, enterprises that emphasize innovation tend to provide a favorable climate that encourages economic development, job creation, and market expansion (Kongolo, 2010). Overall, start-ups leverage diverse techniques such as government financial support, strategic collaborations, and innovation to attract FDI, which eventually promotes economic development.

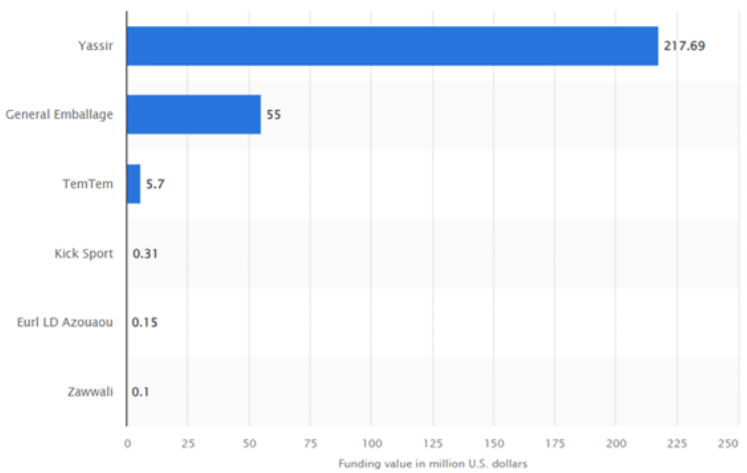
However, it is essential to consider that the significant challenge facing the start-ups' laborers is the high level of uncertainty.

Because of the volatile nature of these kinds of businesses, the employees may face financial insecurity and a high probability of losing their job position at any time.

5. Investment opportunities and government support for the Algerian ventures

The entrepreneurial landscape in Algeria has seen a significant rise in the last few years, with the government willing to transfer from an economy based on the energy sector to more diversified sources of income. Moreover, with the increase in advanced technologies and growing interest in innovation, Algerian entrepreneurs have experienced more critical growth.

Figure 1: Leading start-ups in Algeria as of 2022 by total funding (in a million U.S. dollars)



Source: (Statista, 2023).

As of 2022, the Algerian start-up Yassir reached a remarkable milestone by raising capital for a total of approximately 218 million U.S. dollars, marking the most considerable amount of startup capital raised in Algeria. This accomplishment speaks eloquently about the emerging startup environment in the nation and illustrates the possibilities for innovation and development. Yassir, created in 2016,

is a transport platform. Yassir has succeeded in disrupting the traditional transportation business and delivering a smooth experience for both drivers and passengers by utilizing the mobile app and advanced technologies. By receiving such significant funding, Yassir has proved its ability to attract investors who recognize its potential for growth, expansion, and profitability. It is not only Yassir that has caused effects in the Algerian start-up ecosystem. Other notable start-ups like General Emballage, TemTem, and Kick Sport have also emerged as forces to be reckoned with. These new businesses express the dynamism and diversity of the Algerian entrepreneurial environment. With their innovative concepts, creative solutions, and ambitious targets, they are not only contributing to the economy but also playing a critical part in molding the future of Algeria (Statista, 2023).

Algeria, like several other countries, understands the need to develop a thriving start-up ecosystem that promotes economic development and employment creation. Thus, the government has undertaken several measures, policies, and regulations focused on promoting and assisting start-ups in the whole country. One of these initiatives is the setting up of incubators and innovation centers, which offer entrepreneurs the required infrastructure, mentorship, and networking opportunities to launch and expand their firms. These incubators, like the Sylabs in Algiers and the Sidi Abdellah Technopark in Constantine, provide start-ups access to shared office spaces, high-speed internet, and business development guidance. Moreover, the government has also provided financial incentives to encourage investment in start-ups, including tax reductions and grants. These initiatives not only offer the necessary funding for early-stage enterprises but also indicate the government's commitment to promoting entrepreneurship in Algeria. Additionally, the authorities have developed entrepreneurship training programs and competitions to encourage a culture of innovation, creativity, and entrepreneurship among the young population. These programs not only provide budding entrepreneurs with the essential skills and expertise but also

offer them a platform to advertise their ideas and obtain financial assistance (Benessalah,).

Furthermore, according to the official statistics from the government, the Algerian start-up financing fund, sponsored by six public financial institutions, has achieved an impressive achievement since its establishment in early 2021. With a notable disbursement of 510 million dinars, which is equivalent to 3.2 million euros, the fund has given essential financial assistance to 390 tech project holders. This promising record not only illustrates the fund's performance but also underscores the desire of the government to establish Algeria as a "pole of innovation" in Africa. The start-ups that have been sponsored via this fund operate in a wide variety of sectors, encompassing services, information and communication technologies, health, transport, tourism, biotechnology, and financial services. This broad spectrum of sectors illustrates the fund's effort to promote innovation in numerous areas. As well, the fund's methodology involves equity investments for a limited period, which guarantees that the start-ups get the required assistance to prosper in their early phases. With such solid financial support and a focus on different industries, the Algerian start-up financing fund is considered a key player in developing the country's expanding entrepreneurial ecosystem and paving the way for a more inventive future (Sid-Ali,).

The rise of digital technologies and the internet has opened up new opportunities for innovation and market growth, enabling start-ups in Algeria to tap into global markets and reach a broader client base. The creation of start-ups in Algeria is not only boosting the economy by providing employment opportunities and driving economic growth but also contributing to the establishment of a healthy entrepreneurial ecosystem in the country (Yacine El Mahdi Walid, 2022). This tendency is indicative of a change towards an entrepreneurial mentality and an awareness of the potential of start-ups in promoting innovation and economic development.

Entrepreneurship education plays a major part in building an entrepreneurial attitude among students in Algerian Universities by introducing them to the world of enterprise. Entrepreneurial education equips students with crucial information, skills, and abilities through various courses and workshops that are needed for discovering and exploiting business possibilities. Besides introducing entrepreneurial courses into the curriculum, universities in Algeria may foster an atmosphere that stimulates creativity, innovation, and risk-taking. This sort of education not only develops students' academic knowledge of entrepreneurship but also gives practical experiences via experiential learning. In addition, it instills a feeling of self-confidence and self-efficacy in new graduates, encouraging them to follow their entrepreneurial dreams (Ashari et al., 2021). In the end, we can say that the Algerian universities have changed their position from the traditional role of teaching and research to what is called an "entrepreneurial university," where the Ministry of Higher Education and Scientific Research has signed many alliances and collaborations with businesses universities and institutions, which creates intermediaries between the academic world and business sectors. This new position has a positive influence not only on the scientific and entrepreneurial ecosystem but also on the economic growth of the country.

6. The challenges that face Algerian start-ups

According to data from the Ministry of Knowledge Economy and Start-ups, there has been considerable growth in the number of start-ups in the past few years. The ministry's statistics suggest that out of a total of 3,516 applications received by an ad hoc committee created at the end of 2020, 751 enterprises have already been classified as start-ups. This is a good trend for the entrepreneurial environment since it suggests a rising interest in innovative and competitive company concepts. The recent increase in start-ups may be attributed to numerous causes, including developments in technology, availability of financial funding, and a favorable

regulatory framework (Yacine El Mahdi Walid, 2022).

Nonetheless, despite the huge improvement achieved in the entrepreneurial environment, start-ups, and new businesses with creative concepts, still face many challenges that hinder their growth and potential for success. One of the primary constraints is the limited source of financial resources and investment possibilities accessible to these growing enterprises. Without appropriate financial assistance, start-ups struggle to establish their ideas, develop their operations, and compete in the market.

First, the Algerian government's restricted financial resources, besides administrative and bureaucratic challenges, have prevented the formation of a strong start-up assistance structure. The government's income dependence on traditional industries like the oil and gas sector has resulted in ignoring the potential of the start-up landscape. Additionally, the absence of a well-developed venture capital business in Algeria further exacerbates the financing challenge. Unlike advanced ecosystems, such as Silicon Valley, Algerian entrepreneurs confront difficulty in finding investors who are ready to take high risks on early-stage start-ups (Fetni & Barhoum, 2022).

However, limited access to the resources and infrastructure, such as venture capital, advanced technologies, and highly skilled workers, can present a major challenge and hinder the growth prospects of start-up businesses. Start-ups generally need financial help to invest in product development, marketing, and growth. Without sufficient funds, small companies struggle to compete with established firms and are more likely to fail. As well, restricted access to technology and qualified staff could hinder innovation and limit operational efficiency, thus restricting the development potential of start-ups. In addition to funds, insufficient infrastructure might present challenges for start-ups. Inadequate transportation networks, inconsistent power supply, and poor telecommunications infrastructure may hinder operations and restrict the geographic reach of start-ups.

Without sufficient infrastructure, start-ups may struggle to interact with consumers, suppliers, and investors, hurting their development possibilities (Anderson, 2017).

Cultural and social constraints have a key influence in influencing the success of Algerian start-ups. These hurdles involve different issues that might hamper the establishment and development of entrepreneurial initiatives in Algeria. One of the primary cultural impediments is the prevalent societal norms and beliefs that favor stability and security above risk-taking and innovation. Algerian culture tends to emphasize conventional professions and career pathways, such as government work or positions in established enterprises, which are viewed as more stable and trustworthy. This cultural inclination for stability might deter people from pursuing entrepreneurial pursuits and can lead to a lack of entrepreneurial attitude and risk aversion. Furthermore, social hurdles such as restricted access to capital and resources may pose substantial difficulties to start-ups in Algeria. The researchers underline that most Algerian start-ups experience difficulty in acquiring capital since financial institutions frequently choose to invest in more established and less risky enterprises. This lack of financial backing may restrict the development and expansion of start-ups, lowering their prospects of success. Additionally, the studies also note the absence of a supporting entrepreneurial environment and networking opportunities as social hurdles that hamper the growth of Algerian start-ups. The lack of an active entrepreneurial environment that supports cooperation, mentoring, and knowledge exchange may isolate entrepreneurs and restrict their access to crucial tools and assistance (Bouarar et al., 2022).

Consequently, addressing challenges such as access to funding resources, the absence of infrastructure, and regulatory restrictions may allow start-ups to achieve success and provide additional employment possibilities. By resolving these aspects, start-ups may effectively contribute to lowering unemployment rates and improving economic development.

7. Data and methodology

7.1 Preview of Structural analysis and MICMAC method

Structural analysis is a vital tool in decision-making processes across several sectors, as it helps examine the influence of diverse factors and variables on the intended results. This kind of analysis offers a systematic framework for examining complex systems and comprehending the links between diverse components. By evaluating the structure of a system, decision-makers may discover the primary drivers and interdependencies, enabling them to make educated decisions and enhance results (Thokala et al., 2016).

Case studies are widely utilized to apply structural analysis and the MICMAC approach in real-world scenarios. These methodologies give valuable insights into a system's complex linkages and dynamics, helping decision-makers to better comprehend the underlying variables that lead to specific results. Structural analysis allows for the identification and visualization of the essential components and relationships within a system, offering a comprehensive perspective of the system's structure. On the other hand, the MICMAC[1] approach is a strong tool for studying the influence and dependent connections among different components of a system. By applying these methodologies to real-world case studies, academics and practitioners may obtain a better knowledge of the underlying dynamics and use their findings to make intelligent choices (Shahedi et al., 2023).

The MICMAC analysis includes two matrices: the driving power-dependence matrix and the driving power-influence matrix. These matrices allow to divide the variables into four distinct groups: autonomous, dependent, dependent and autonomous, and linkage. The autonomous variables have considerable driving power and are not impacted by other factors, compared to the dependent variables have

[1] Matrice d'Impacts Croisés Multiplication Appliquée à un Classement.

limited driving power and are influenced by other variables. The dependent and autonomous variables have both driving power and influence, whereas the linkage variables have low driving power and low influence. The MICMAC method offers a helpful understanding of the structure of a system, enabling researchers and practitioners to concentrate their efforts and resources on the most relevant aspects (Nematpour et al., 2021).

7.2 The list of variables

The initial phase in the empirical study is the listing of variables. Table 1 (Annex 1) offers more information on the variables used in this academic study.

7.3 Analysis and results

7.3.1 Direct Influences Matrix

MID shows the direct influences and relationships across the system's variables.

Table 2: Direct Influences Matrix

	pol_sta	reg_fram	corr_tran	bureau	fin_sec	fintech	gov_fund_s	ven_cap	fdi	tax_pol	enrg_sec	bus_cli	private	comp_mrkt	trad_exp	GDP	mrkt_cnsum	Innova	Digi	infra_inrn	tech_adv	entre_mind	cult_cnst	net_cnnct	gend_rol	educ_sys	bra_dra	unemp	labr_cos	wkfr_skil
Pol_Sta	0	0	1	0	1	0	0	1	2	0	0	2	0	0	1	2	0	0	0	0	0	P2	0	0	0	P1	3	1	0	P1
Reg_Fram	0	0	2	2	0	P3	0	3	0	0	0	2	0	3	0	0	0	0	0	0	0	P1	0	0	2	2	0	P2	P3	0
Corr_Tran	1	2	0	3	2	2	0	3	0	1	0	3	0	3	2	0	0	1	P1	0	P1	0	0	0	0	0	P1	1	0	0
Bureau	0	2	2	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	P1	0	1	0	0	0	0	2	1	0	P2
Fin_Sec	1	2	0	0	0	3	2	3	2	0	1	3	0	0	0	3	0	1	0	0	1	P3	0	0	1	0	0	0	1	0
FinTech	0	1	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gov_Fund_S	0	0	0	0	0	2	0	2	0	0	0	2	0	0	0	0	0	2	0	3	1	2	0	0	2	0	2	2	0	0
Ven_Cap	0	P2	0	P1	0	3	2	0	0	0	0	1	0	0	0	0	3	0	0	2	0	0	0	0	1	0	1	2	0	0
FDI	0	0	0	0	2	0	P3	3	0	0	0	2	0	0	2	0	1	0	P3	P3	P3	0	0	0	P3	0	P3	1	0	0
Tax_Pol	0	0	P3	0	0	0	3	2	1	0	0	2	0	2	0	0	0	1	0	0	0	1	1	0	2	0	0	0	2	0
Enrg_Sec	0	0	0	0	0	3	0	0	0	0	2	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1
Bus_Cli	0	P3	0	0	0	0	3	2	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	2	2	3	3	2	0
Private	0	0	0	0	0	0	1	0	0	0	1	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	1
Comp_Mrkt	0	1	0	0	0	0	0	3	0	1	0	2	0	0	0	0	0	3	0	0	0	0	1	1	2	0	0	2	2	0
Trad_Exp	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GDP	0	0	0	0	0	2	0	0	2	0	1	0	1	0	0	2	1	0	2	0	0	0	0	0	0	0	2	2	0	
Mrkt_Cnsum	0	1	0	0	1	0	0	2	0	0	0	1	0	0	0	0	0	2	0	0	2	0	0	0	1	0	0	0	0	0
Innova	0	2	0	0	2	3	0	0	0	0	P3	3	0	3	0	2	0	0	3	2	3	0	1	1	0	2	0	1	0	0
Digi	0	0	0	2	3	3	0	0	0	0	P3	3	0	2	2	1	0	3	0	3	0	0	1	P3	1	1	0	P3	0	0
Infra_Inrn	0	0	0	P3	0	2	0	2	0	0	0	2	0	2	1	3	0	3	3	0	0	P3	P1	P3	P1	1	1	2	P3	1
Tech_Adv	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Entre_Mind	0	0	0	0	0	P1	1	3	0	0	0	1	0	1	1	0	P3	2	0	0	P3	0	2	2	2	0	0	1	1	P3
Cult_Cnst	0	0	0	0	0	2	0	3	0	0	0	1	0	1	P1	0	0	2	0	0	0	3	0	0	3	0	2	P2	P1	2
Net_Cnnct	0	0	2	0	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	2	0	0	2	0	0	P1	0	0
Gend_Rol	0	1	0	0	0	0	2	0	0	0	0	1	0	2	0	0	0	1	0	0	0	0	P3	0	0	0	0	0	0	2
Educ_Sys	0	1	0	0	0	0	0	0	0	0	0	1	0	P3	0	P3	1	3	0	0	2	3	2	2	3	0	3	2	2	3
Bra_Dra	0	0	0	0	0	0	0	1	1	0	0	2	0	2	0	1	0	3	P3	0	3	0	0	0	0	0	0	1	0	3
Unempl	0	P1	P3	0	0	0	3	0	0	0	0	0	0	1	0	3	0	2	0	0	0	2	0	0	2	0	3	0	3	0
Labr_Cos	0	P3	2	0	1	0	0	0	0	2	0	3	0	2	0	0	0	2	0	0	0	0	0	0	2	0	3	3	0	2
Wkfr_Skil	0	P3	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	3	2	0	2	0	0	0	2	0	0	2	2	0

Source: Realized using MICMAC software.

The influences are rated from zero to three, where 0: No influence, 1: Low, 2: Medium, 3: Strong, with the option to grade the potential influences: P1: Potential 1, P2: Potential 2, P3: Potential 3.

Table 3: The Characteristics of Direct Influence Matrix

Indicator	Value
Matrix size	30
Number of iterations	8
Number of zeroes	597
Number of ones	86
Number of twos	112
Number of threes	56
Number of P1s	15
Number of P2s	5
Number of P3s	29
Total	303
Filling ratio	33.667%

Source: Realized using MICMAC software.

Table 3 describes the number of 0, 1, 2, and 3 and the number of potential influences besides, the filling ratio is determined as the ratio between the number of different MID values of 0 and the total number of elements of the matrix.

In our study, the 33.667% filling ratio represents the direct influences between the system's variables. This ratio is lower than 35%, it is considered a good ratio of filling according to the rule established by Michel GODET LIPSOR. The following steps of the MICMAC method on which structural analysis is based should discover 66.333% of the rest indirect influences.

Table 4: Sums of rows and columns of MID

Variable	Total of lines	Total of columns
Political Stability	14	2
Regulatory Framework	16	14
Corruption and Transparency	24	9
Bureaucracy	11	8
Financial Sector	24	18
Financial Technology (FinTech)	4	21
Government Funding Support	20	18
Venture Capital	15	36
Foreign Direct Investment	11	9
Taxation Policy	17	7
Energy Sector	13	1
Business Climate	20	43
Privatization	9	1
Competition and Market Entry Barriers	18	29
Trade Policy and Export Opportunities	1	11
Economic Growth	15	20
Market Needs and Consumer Behavior	10	4
Innovation	28	39
Digitalization	25	8
Infrastructure and Internet availability	23	10
Technological Advancement	3	16
Entrepreneurial Mindset	17	15
Cultural and Social Constraints	19	9
Networks and Connections	10	6
Gender Role	9	30
Educational System	28	8
Brain Drain	17	23

Unemployment	19	29
Labor Cost	22	19
Workforce Skills Diversity	16	15

Source: Realized using MICMAC software.

Table 4 provides information about the totals in the rows and columns of the MID matrix, which will be the coordinates for each variable later on. This table was also used to learn the most influential variables and the more dependent ones in the system.

Weight of each concept $W = W' + W''$ with W': sum of lines and W'': Column totals, for example, W1=14+2 =16.

The most influential variables in the system are the ones with the highest sum in the lines, which are:

- Educational System
- Innovation
- Digitalization
- Financial Sector
- Corruption and Transparency

The most dependent variables in the system are the ones with the highest sum in the columns, which are:

- Business Climate
- Innovation
- Venture Capital
- Gender Role
- Unemployment

Table 5: The stability of MID

Iteration	Influence |	Dependency |

	Influences	Dependencies
2	97.97	98.3
3	98.96	100.58
4	100.52	99.43
5	100	100
6	100	100
7	100	100
8	100	100
9	100	100

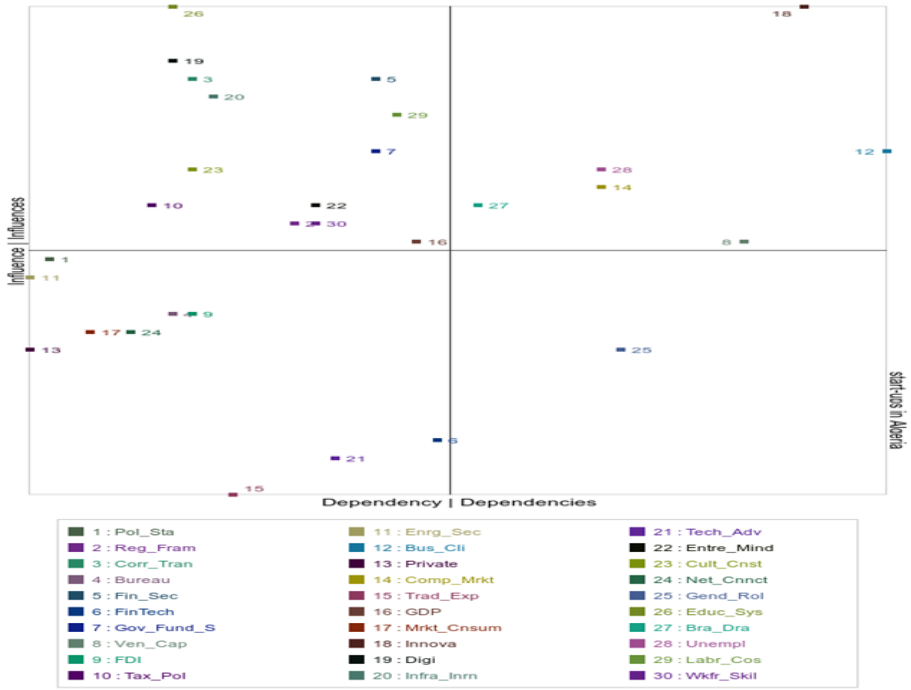
Source: Realized using MICMAC software.

Table 5 highlights that the Direct Influences Matrix becomes stable starting from iteration 5, which means that from this iteration, the classification of the variables by influence and by dependence no longer changes since all indirect influence relationships have been discovered. Likewise, the longest path is of length 5.

7.3.2 Plan of Direct Influences/Despondencies

This plan was developed from the matrix of direct influences MID.

Figure 2: View of direct influences/dependencies



Source: Realized using MICMAC software

This plan provides the final outcome of the MICMAC approach used to examine the interactions of this system's variables. The above plan is split into five sections:

Section 1: combines the variables; Cultural and Social Constraints, Government Funding Support, Labor Cost, Financial Sector, Infrastructure and Internet availability, Corruption and Transparency, Digitalization, and Educational System: the determining variables, or the autonomous variables, have considerable driving power and they are the most influential and the less dependent on the development of the system's other variables. Which means they are not affected by the evaluation of the other factors. However, such variables guide and determine the system's progress.

Section 2: combines the variables; Innovation, Business Climate, Unemployment, venture capitals, and Competition and Market Entry Barriers: in this section, we can discover the Key variables. They have

both significant driving power and a great deal of autonomy, which means very influential and very independent factors.

Such critical variables should be taken into consideration and watched carefully during the building of scenarios and potential strategies.

Section 3: We find Gender Role as the only result and/or dependent variable in the system of our study. It is not very influential, which means it has limited driving power, but it is very dependent and affected by other system factors. The evaluation of its value is explained by the other variables' progress.

Section 4: Combines the variables, Privatization, besides Trade Policy and Export Opportunities, the excluded variables, because they have neither driving power nor influence. This means these variables are low influential and less dependent on the system.

Section 5: "Peloton" or Middle cluster variables. This sector regroups the variables; Political Stability, Energy Sector, Bureaucracy, Foreign Direct Investment, Market Needs and Consumer Behavior, Networks and Connections, Technological Advancement, Financial Technology (FinTech), Taxation Policy, Entrepreneurial Mindset, Regulatory Framework, Workforce Skills Diversity, Economic Growth, and Brain Drain.

Such variables are moderately influential and/or dependent factors. Regarding these unknowns, we have no comment. Nonetheless, they should be taken into consideration when we conduct the individual analysis of the system's variables because they play a crucial role in the dynamism of the system.

7.3.3 Matrix of potential direct influences

The matrix represents the potential influences and dependency

relationships between the variables of the system, where we changed the "P" value to 3 in order to discover the potential linkages and impacts.

Table 6: MPDI characteristics

Indicator	Value
Matrix size	30
Number of iterations	8
Number of zeroes	597
Number of ones	86
Number of twos	112
Number of threes	105
Number of P1s	0
Number of P2s	0
Number of P3s	0
Total	303
Filling ratio	33.667%

Source: Realized using MICMAC software

The table above shows the filling ratio of the Matrix of Potential Direct Influences, which is less than 35%, and the next table was used to determine the more driving power and great influence variables.

Table 7: Sums of rows and columns of MPDI

Variable	Total of lines	Total of columns
Political Stability	23	2
Regulatory Framework	28	29
Corruption and Transparency	33	15
Bureaucracy	17	14
Financial Sector	27	18
Financial Technology (FinTech)	4	27
Government Funding Support	20	21
Venture Capital	21	36

Foreign Direct Investment	29	9
Taxation Policy	20	7
Energy Sector	13	7
Business Climate	23	43
Privatization	9	1
Competition and Market Entry Barriers	18	32
Trade Policy and Export Opportunities	1	14
Economic Growth	15	23
Market Needs and Consumer Behavior	10	7
Innovation	31	39
Digitalization	34	17
Infrastructure and Internet availability	41	16
Technological Advancement	3	25
Entrepreneurial Mindset	29	27
Cultural and Social Constraints	28	15
Networks and Connections	13	12
Gender Role	12	36
Educational System	34	11
Brain Drain	20	29
Unemployment	25	41
Labor Cost	25	28
Workforce Skills Diversity	19	24

Source: Realized using MICMAC software.

The most influential variables are:

- Educational System
- Digitalization
- Corruption and Transparency
- Innovation

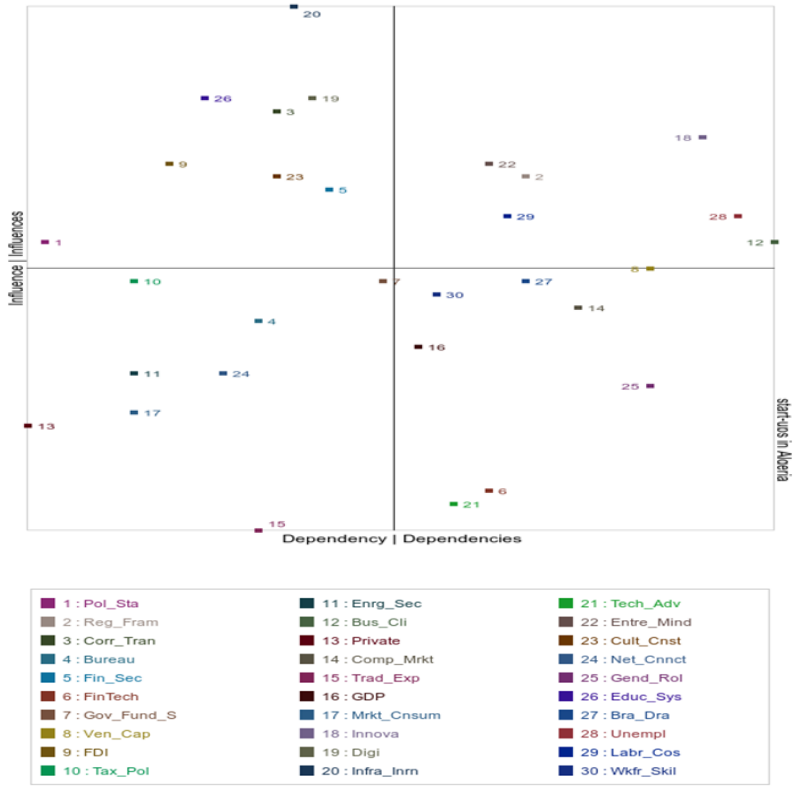
The most dependent variables are:

- Business Climate
- Unemployment

7.3.4 Plan of potential direct influences/dependencies

This plan is established based on the matrix of potential direct influence dependencies.

Figure 3: View of potential direct influences/dependencies



Source: Realized using MICMAC software.

Taking into consideration the potential influence relationships in the system and setting the value of P=3, we can remark that many of the variables are changed their positions, such as "Foreign Direct Investment," which shifts from Middle cluster variables to the key variable. This change is due to the fact that this variable exerts

potential effects on other variables and its possible driving power on the system.

8. Conclusion

In conclusion, the emergence of start-ups as a viable solution to Algeria's high unemployment rate and as a driver of economic development in the country has taken place in recent years. Because of their innovative nature, adaptability, and ability to provide new employment opportunities, start-up businesses have the capacity to meet the issues that the Algerian economy is now facing. The government and other important players may create a favorable climate for the growth of these businesses by encouraging the development of an entrepreneurial ecosystem and offering assistance to newly established businesses. In addition, by exploiting the advantages of advanced technologies and encouraging partnerships and cooperation, start-ups have the potential to contribute to the diversification of the economy as well as the creation of new industries. With rational policies and the appropriate regulation frameworks, besides the right investment decisions, start-ups can play a significant role in absorbing the high unemployment rate and accelerating Algerian economic growth in the next years.

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10. Appendices

Table 1: List of variables

N°	Long title	Court title	Theme	Description
1	Political Stability	Pol_Sta	Political	Democracy and coups.
2	Regulatory Framework	Reg_Fram	Political	Various regulations about entrepreneurial and start-up firms.
3	Corruption and Transparency	Corr_Tran	Political	Various laws and regulations against corruption and ensuring transparency and accountability in government institutions.
4	Bureaucracy	Bureau	Political	The structure of administration or management in which decisions and operations are made via a hierarchical system of specialized offices, processes, laws, and norms.
5	Financial Sector	Fin_Sec	Finance	Refers to a section of the economic activity and institutions that manage, exchange, and allocate money, assets, and financial resources. Which include the banking system and insurance companies, and the financial market.
6	Financial Technology (FinTech)	FinTech	Finance	Offer innovative financial services and products using advanced technology, such as digital platforms and mobile apps.
7	Government Funding Support	Gov_Fund_S	Finance	Government national funds and agencies that provide monetary and financial assistance to the early stage businesses.
8	Venture Capital	Ven_Cap	Finance	Investors that provide financial support to highly risky projects with high potential profits and early-stage start-ups.
9	Foreign Direct Investment	FDI	Finance	Measured by the inflow or outflow of foreign capital and financial assets.
10	Taxation Policy	Tax_Pol	Economic	Measured by the tax rate: The percentage of income or value that individuals or corporations are obligated to pay as taxes on their taxable revenue, profits, or activities.
11	Energy Sector	Rnrg_Sec	Economic	Revenues and production in the oil and gas industry.
12	Business Climate	Bus_Cli	Economic	Measured by the business index, which is a statistical tool used to assess and evaluate the different aspects of the Business environment.
13	Privatization	Private	Economic	The role of the private sector in economic development.
14	Competition and Market Entry Barriers	Comp_Mrkt	Economic	The rules and the laws about ensuring fair competition and prohibiting the monopoly, cartels, and abuses that face new businesses in the market.
15	Trade Policy and Export Opportunities	Trad_Exp	Economic	All the regulations and laws concerning trade and encouraging the export of domestic products.
16	Economic Growth	GDP	Economic	Measured by Gross Domestic Product.
17	Market Needs and Consumer Behavior	Mrkt_Cnsum	Economic	Cultural preferences, interests, and spending habits might influence the demand for specific goods or services.
18	Innovation	Innova	Economic	The techniques of introducing new ideas, approaches, goods, or services that result in important advances, developments, or changes in different areas of society, industry, or technology.
19	Digitalization	Digi	Technological	Transformation into digital services that provide simpler storage, access, modification, and delivery of data and information.
20	Infrastructure and Internet availability	Infra_Inrnt	Technological	General facilities, including the availability of the Internet and electricity.
21	Technological Advancement	Tech_Adv	Technological	Corresponds to the continuous improvement and development of new technologies that contribute to considerable progress and innovation in numerous industries.
22	Entrepreneurial Mindset	Entre_Mind	Social	Willing People to start their own businesses and invest their savings, make highly risky decisions and accept failure.
23	Cultural and Social Constraints	Cult_Cnst	Social	The preferences of the people to work in traditional industries and public sector positions.
24	Networks and Connections	Net_Cnnct	Social	Social relationships with the business community may offer valuable assistance, advice, partnerships, and financial support.
25	Gender Role	Gend_Rol	Social	Societal attitudes towards female entrepreneurship and the representation of women in the business areas.
26	Educational System	Educ_Sys	labor market	Quality of education, training programs, and the role of Algerian Universities in preparing a qualified workforce can face challenges.
27	Brain Drain	Bra_Dra	labor market	Highly skilled individuals that are leaving the country for better opportunities abroad.
28	Unemployment	Unempl	labor market	Measured by the unemployment rate and the active population that is looking for job opportunities.
29	Labor Cost	Labr_Cos	labor market	Measured by wages and salaries.
30	Workforce Skills Diversity	Wkfr_Skil	labor market	The variety and differences among laborers and active population.

Source: Realized by the researchers.